

REMARKS

Applicants appreciate the Examiner's thorough examination of the present application as evidenced by the Office Action of May 10, 2004 (hereinafter "Office Action"). Applicants especially appreciate the indication that Claims 37 and 38 recite patentable subject matter. In response, Applicants have canceled Claims 25 - 30 without prejudice or disclaimer. Moreover, rather than writing Claims 37 and 38 in independent form at this time, Applicants respectfully submit that the cited references do not disclose or suggest all of the recitations of the independent claims. Accordingly, Applicants submit that all pending claims are in condition for allowance. Favorable reconsideration of all pending claims is respectfully requested for at least the reasons discussed hereafter.

Independent Claims 1, 10, 40, 48, 61, and 69 are Patentable

Independent Claims 1, 40, and 61 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U. S. Patent No. 6,263,429 to Siska (hereinafter "Siska") in view of U. S. Patent No. 6,587,939 to Takano ("Takano"). Independent Claims 10, 48, and 69 stand rejected under 35 U.S.C. §102(e) as being anticipated by Siska.

Independent Claim 1 is directed to a method of compressing a computer program and is reproduced below:

scanning an initial computer program to identify a first plurality of uncompressed instructions therein having a high frequency of use;
populating a first storage mechanism with the identified first plurality of uncompressed instructions; and
generating a first compressed computer program by replacing each of a plurality of the identified first plurality of uncompressed instructions in the initial computer program with a respective first type of compressed instruction that identifies a location of the corresponding uncompressed instruction in the first storage mechanism.

Independent Claims 10, 40, 48, 61, and 69 include similar recitations. According to independent Claim 1, the first compressed computer program is generated by replacing each

of the plurality of the identified first plurality of uncompressed instructions in the initial computer program with a respective first type of compressed instruction.

In sharp contrast to the recitations of Claim 1, both Siska and Takano are directed to systems in which a sequence of instructions is replaced with a "compressed" instruction. For example, Siska explains that "each sequence of lines of code in the collection is replaced in the program by a microcall to the saved microroutine..." (Siska, col. 8, lines 26 - 28). Similarly, Takano describes the executable instruction extracting unit 14 as converting "the constituent compressed instructions into the corresponding sequence of executable instructions..." (Takano, col. 3, lines 62 - 64; emphasis added). Thus, unlike the recitations of Claim 1, Siska and Takano are directed to systems in which a sequence of instructions are compressed together rather than compressing instructions on an individual basis.

Accordingly, for at least the foregoing reasons, Applicants respectfully submit that independent Claims 1, 10, 40, 48, 61, and 69 are patentable over the cited references and that Claims 2 - 9, 11 - 17, 41 - 47, 49 - 51, 62 - 68, and 70 - 72 are patentable at least per the patentability of independent Claims 1, 10, 40, 48, 61, and 69.

Independent Claim 14 is Patentable

Independent Claim 14 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Siska in view of Takano. Independent Claim 14 is directed to a method of compressing a computer program and is reproduced below:

- respectively scanning each of a plurality of routines in an initial computer program to identify a first plurality of uncompressed instructions in each of the plurality of routines that have a high frequency of use;
- respectively populating first storage mechanisms with the identified first plurality of uncompressed instructions from each of the plurality of routines; and
- generating a first compressed computer program by respectively replacing each of a plurality of the identified first plurality of uncompressed instructions in each of the plurality of routines with a respective first compressed instruction that identifies a location of the corresponding uncompressed instruction in a respective one of the first storage mechanisms.

According to independent Claim 14, the first compressed computer program is generated by replacing each of the plurality of the identified first plurality of uncompressed instructions in the initial computer program with a respective first type of compressed instruction.

Moreover, separate storage mechanisms are used to hold the uncompressed instructions from each of the plurality of routines. Thus, each routine has a storage mechanism associated therewith for holding the uncompressed instructions from that routine.

Applicants respectfully submit that independent Claim 14 is patentable for at least the reasons discussed above with respect to Claims 1, 10, 40, 48, 61, and 69. Applicants further submit, however, that neither Siska nor Takano disclose or suggest dividing the original uncompressed program into routines and using separate storage mechanisms to hold the uncompressed instructions from each of the routines as recited in independent Claim 14.

Accordingly, for at least the foregoing reasons, Applicants respectfully submit that independent Claim 14 is patentable over the cited references and that Claim 15 is patentable at least per the patentability of independent Claim 14.

Independent Claims 16, 52, and 73 are Patentable

Independent Claims 16, 52, and 73 stand rejected under 35 U.S.C. §102(e) as being anticipated by U. S. Patent No. 6,691,305 to Henkel et al. ("hereinafter Henkel").

Independent Claim 16 is directed to a method of executing a computer program and is reproduced below:

- fetching an instruction from a memory;
- decoding the fetched instruction to determine whether the fetched instruction is an uncompressed instruction, a first type of compressed instruction, a second type of compressed instruction, or a third type of compressed instruction;
- decoding the fetched instruction to identify a location in a first logical data structure, if the fetched instruction is a compressed instruction of the first type;
- providing a first uncompressed instruction, which is located at the location in the first logical data structure, to a processor for execution if the fetched instruction is a compressed instruction of the first type;
- decoding the fetched instruction to identify a location in a second

logical data structure, if the fetched instruction is a compressed instruction of the second type;

combining portions of the fetched instruction with portions of an at least partially uncompressed instruction, which is located at the location in the second logical data structure, to generate a second uncompressed instruction if the fetched instruction is a compressed instruction of the second type;

providing the second uncompressed instruction to the processor for execution if the fetched instruction is a compressed instruction of the second type;

decoding the fetched instruction to identify a location in a third logical data structure, if the fetched instruction is a compressed instruction of the third type;

decoding the fetched instruction to identify a location in an operand data structure, if the fetched instruction is a compressed instruction of the third type;

combining a non-operand portion of an uncompressed instruction, which is located at the location in the third logical data structure, with an operand portion of the uncompressed instruction, which is located at the location in the operand data structure, to generate a third uncompressed instruction if the fetched instruction is a compressed instruction of the third type; and

providing the third uncompressed instruction to the processor for execution, if the fetched instruction is a compressed instruction of the third type. (Emphasis added).

Independent Claims 52 and 73 include similar recitations. According to independent Claim 16, a third type of compressed instruction is uncompressed by combining a non-operand portion of an uncompressed instruction with an operand portion of the uncompressed instructions, which are located in separate data structures as indicated by the highlighted portion of Claim 16 reproduced above. Applicants respectfully submit that Henkel contains no disclosure or suggestion of decompressing a compressed instruction using separate data structures to hold the operand portion and non-operand portion of a compressed instruction. Rather, Henkel describes the use of mathematical encoding to compress instructions as indicated at col. 15, lines 48 - 57.

Accordingly, for at least the foregoing reasons, Applicants respectfully submit that independent Claims 16, 52, and 73 are patentable over the cited reference and that Claims 17 - 19, 53 - 55, and 74 - 76 are patentable at least per the patentability of independent Claims

16, 52, and 73.

Independent Claims 20, 56, and 77 are Patentable

Independent Claims 20, 56, and 77 stand rejected under 35 U.S.C. §102(e) as being anticipated by Henkel. Independent Claim 20 is directed to a method of executing a computer program and is reproduced below:

fetching an instruction associated with one of a plurality of routines from a memory;
decoding the fetched instruction to determine whether the fetched instruction is an uncompressed instruction or a first type of compressed instruction;
decoding the fetched instruction to identify a location in a first logical data structure that is exclusively associated with the one of the plurality of routines, if the fetched instruction is a compressed instruction of the first type;
and
providing a first uncompressed instruction, which is located at the location in the first logical data structure, to a processor for execution if the fetched instruction is a compressed instruction of the first type.

Independent Claims 56 and 77 include similar recitations. According to independent Claim 20, a first logical data structure is exclusively associated with one of the plurality of routines and holds the uncompressed instruction. Applicants respectfully submit that Henkel does not disclose or suggest dividing the original program into routines and exclusively associating a data structure with a routine as recited in Claim 20.

Accordingly, for at least the foregoing reasons, Applicants respectfully submit that independent Claims 20, 56, and 77 are patentable over the cited reference and that Claims 21 - 24, 57 - 60, and 78 - 81 are patentable at least per the patentability of independent Claims 20, 56, and 77.

Independent Claim 31 is Patentable

Independent Claim 31 stands rejected under 35 U.S.C. §102(e) as being anticipated by Henkel. Independent Claim 31 is directed to a data processing system for decompressing

compressed computer program instructions and is reproduced below:

an instruction type decoding unit having a data input that receives an instruction and determines whether the received instruction is an uncompressed instruction, a first type of compressed instruction, a second type of compressed instruction, or a third type of compressed instruction;
a first decompression sub-engine for the first type of compressed instruction having a data input coupled to a first data output of the instruction type decoding unit; and
a second decompression sub-engine for the second type of compressed instruction having a data input coupled to a second data output of the instruction type decoding unit.

Thus, according to independent Claim 31, the data processing unit comprises a first and a second decompression sub-engine for the first and second types of compressed instructions, respectively. In sharp contrast to the recitations of independent Claim 31, Henkel discloses the use of a single decompression engine 7 as illustrated in FIGS. 17 and 18.

Accordingly, for at least the foregoing reasons, Applicants respectfully submit that independent Claim 31 is patentable over the cited reference and that Claims 32 - 39 are patentable at least per the patentability of independent Claim 31.

In re: Budrovic et al.
Serial No.: 09/736,682
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CONCLUSION

In light of the above amendments and remarks, Applicants respectfully submit that the above-entitled application is now in condition for allowance. Favorable reconsideration of this application, as amended, is respectfully requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (919) 854-1400.

Respectfully submitted,



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